

# Emergency Response System

## TECHNICAL FIELD

The field of the invention is that of wireless communications, in particular, contacting help in the event of a medical emergency.

## BACKGROUND OF THE INVENTION

Contacting a source of help in the event of an emergency is a problem that has been addressed in many ways over the years. A common solution in the United States of America is the "911" telephone number, which connects the caller to an operator trained to identify a number of emergency situations and having access to communication equipment to contact the police, ambulance, fire department and the like. Similar facilities are available in many countries.

Each year, however, many situations are not responded to because the victim cannot get to a telephone or cannot dial and/or speak. Many medical emergencies incapacitate the victims so severely that they are unable to move or to summon help. For example, many people fall, breaking a hip or otherwise becoming sufficiently incapacitated that they are unable to reach a phone, even though they could dial and call for help if they were able to get to the phone.

1 In other cases, victims are unable to speak (e.g. in the event of a stroke)  
2 although they are able to reach a phone.

3 In still other cases, the victim is able to reach a phone and call, but does not  
4 know where he or she is sufficiently well to give directions to emergency  
5 personnel.

6 Thus, there is a need for a system that will call for help once activated and  
7 compensate for incapacity of various kinds.

## 8 SUMMARY OF THE INVENTION

9 The invention relates to a system for calling an emergency number in  
10 response to a simple activation signal.

11 A feature of the invention is the provision in a wearable (portable)  
12 emergency device of stored information relevant to various emergency  
13 situations.

14 An additional feature of the invention is the capability of the device to  
15 contain and the capability of seamlessly updating unique user information  
16 and any necessary medical information relevant to the user.

17 Another feature of the invention is a provision for an emergency service  
18 operator to query the stored information.

19 Another feature of the invention is a piece of software on the mobile phone  
20 that interacts with the device to convey the user data stored on the wearable

1 device to the 911 network.

## 2 BRIEF DESCRIPTION OF THE DRAWING

3 Figure 1 illustrates in condensed form a system for use with the invention.

4 Figure 2 illustrates a table of stored information.

5 Figure 3 illustrates a sequence in an emergency call using the invention.

## 6 BEST MODE OF CARRYING OUT THE INVENTION

7 Figure 1 shows a schematic view of a system for using the invention, in  
8 which an emergency device 100 responds to the press of a button 105 to  
9 communicate with a mobile telephone 130, illustratively through the  
10 Bluetooth wireless protocol. Telephone 130 calls the "911" emergency  
11 number (shown as box 250) through the local telephone company 200.

12 According to the invention, if the user is incapacitated and unable to supply  
13 information that the 911 operator needs in order to decide what support to  
14 send and where to send it, the information is supplied from a memory  
15 attached to the emergency device.

16 Emergency device 100 may take any convenient form - a bracelet, pin,  
17 watch, etc. Functionally, it is a wireless transmitter that initiates  
18 communication with the mobile phone 130 and supplies information from  
19 non-volatile memory 103 in response to prompts from the 911 operator.

1 Software 135, stored in the mobile phone, executes some functions in the  
2 sequence - i.e. calling the 911 operator and, in response to signals from the  
3 operator, querying the data in memory 103. Other relevant software may be  
4 stored in system 200 and invoked by telephone 130.

5 As an example, consider a situation in which the user of the system suffers a  
6 heart attack or other incapacitating situation. He or she presses button 105,  
7 which initiates the sequence according to the invention. Button 105 may be  
8 replaced by any activation device that can be activated by the user/victim.

9 Device 100 transmits a signal to phone 130, illustratively a mobile phone  
10 carried by the victim. Phone 130 calls 911. When the operator answers, a  
11 signal transmitted by the 911 telephone apparatus is passed through the  
12 system to alert the 911 operator that stored information is available.

13 If the victim is able to speak, the 911 operator can perform the usual  
14 queries. The stored medical information is available and can be sent either  
15 automatically or in response to a signal from device 100 or phone 130.  
16 Some of the stored medical information may have been forgotten by the  
17 victim and therefore useful even if the victim can speak.

18 If the victim cannot speak, the operator can examine the stored information  
19 and use it to assist in the decision as to what help to send. For example, the  
20 information may contain data that the victim has hypertension and is a  
21 candidate for a stroke.

22 A useful feature of the invention is that, if the telephone is equipped with a  
23 Global Positioning System (GPS) receiver, the phone can be programmed to  
24 transmit that information to the 911 operator. At least once, a kidnapping

1 victim was able to turn on his mobile phone and call 911, but did not know  
2 his location. The local phone system did not have the capacity to locate the  
3 mobile phone and the police were unable to assist.

4 Figure 2 shows a list of information that may be supplied according to the  
5 invention. Identity would include the information that 911 ordinarily asks -  
6 name, address, phone number (home, office, mobile), etc. Medical  
7 Information may include known problems, such as heart conditions, asthma,  
8 epilepsy, allergies, etc. Contact information may include one or more  
9 names and phone numbers of people (including the victim's doctor) who  
10 know the victim and can supply some information, e.g. the intended location  
11 of the victim, clothing worn that day, etc. Location information may be  
12 supplied by a GPS receiver in the phone 130 or by the local phone system if  
13 it has equipment that can calculate the victim's location by analyzing signals  
14 received by a number of base stations. If the victim does not speak English  
15 or another language spoken by the 911 operator, the stored data could  
16 include recorded phrases in the victim's language that could be played in  
17 response to a signal from the 911 operator, e.g. "an ambulance is on the  
18 way".

19 Figure 3 shows a sample sequence of a response to a signal from a victim.

20 The victim has pressed the button 105, and the emergency device has sent a  
21 signal to mobile phone 130, which is turned on.  
22 Phone 130 calls 911, using the usual format of the local telephone company.

23 The 911 operator answers and receives a signal (e.g. a recorded message)  
24 informing her that an automated emergency call has been placed. The term  
25 "911 operator" is used for convenience. The functions described could be

1 performed by another agency or by a private alarm service.

2 The 911 operator answers by voice, asking for a response. (Optionally, the  
3 data are transmitted whether the victim can answer or not and appear on a  
4 screen for the 911 operator.)

5 If there is no voice response, it is assumed that there is a medical  
6 emergency.

7 Preferably, the data are transmitted in response to a request from the 911  
8 operator and appear on a screen for the 911 operator. This approach reduces  
9 the complexity of transmitting the data in a different format from voice (e.g.  
10 in text messaging format) and arranging for the data to appear on the screen  
11 of the operator handling the voice call, since the request from the operator  
12 can trigger a sequence of actions that direct the data from the calling phone  
13 to that particular operator's screen.

14 The operator will then step through the standard sequence, making contact  
15 with the contacts listed if appropriate, and transmitting an ambulance or  
16 police as appropriate.

17 If the default phone is turned off or otherwise malfunctioning, the system  
18 may: - 1) automatically turn phone 130 on or 2) other phones in the vicinity  
19 would respond to the Bluetooth signal. Since the Bluetooth signal is RF, it  
20 will be received by all phones in range. An alternative approach is that if  
21 the emergency device does not receive a response from the default phone, it  
22 automatically signals other phones with a distinctive signal pattern and any  
23 phone within range calls 911 and relays the data. Another alternative  
24 approach is to ask nearby phone users for assistance. Which of these

1 approaches, if any, is used would depend on considerations other than  
2 technical, such as legal liability.

3 Mobile handset 130 will support Bluetooth.

4 Software 135 will have appropriate commands to stand by to receive the  
5 Bluetooth signal, to query the emergency device for data, call 911 and then  
6 to relay the data as described above.

7 Preferably, the call to 911 will be done using the usual phone signals as  
8 much as possible to minimize the changes to be made to the phone system.  
9 Data (stored data from memory, GPS data) will be sent to 911 in appropriate  
10 format (e.g. text messaging for the memory data). A wakeup sequence and  
11 circuitry to carry it out will be stored within the handset, for use in the  
12 situations when a) the phone's owner is the victim, but the phone is turned  
13 off and b) the phone of a victim is turned off and a third party is in range of  
14 the Bluetooth signal.

15 It will be evident that it is important that the stored data are current. As a  
16 default, the stored data may be entered by connecting the activation device  
17 to a keypad and updating the data. If the system relies on the user to update  
18 the data, that would be a potential source of errors. More conveniently, the  
19 data could be updated by personnel in the doctor's office, who are likely to  
20 make few entry errors and can be trained to enter the data as part of their  
21 routine. Additionally, the data could be updated by the pharmacist  
22 dispensing medications. In one or both of these cases, the data could be  
23 entered by keying into a Bluetooth transmitter that transmits the data (or is  
24 connected by a cable) to device 100.

25 The system can be implemented with many alternatives.

1  
2 For example, it is desirable that the 911 equipment does not have to be  
3 modified to use the information. One potential problem is that the stored  
4 data will not fit (be compatible) with the format for voice calls, so that there  
5 would have to be some accommodation made to present the data to the 911  
6 operator on a screen for easy viewing. One approach is that System 200 is  
7 programmed to receive a signal from phone 130 that a system according to  
8 the invention is in use and transmits a notice to 911, together with data  
9 identifying the screen data. The screen data is transmitted on a parallel  
10 channel 210 and is routed within the 911 facility to the appropriate operator.  
11 The local phone company would take care of the technical details, so that  
12 adoption of the invention does not depend on the technical capabilities of  
13 the 911 department.

14 Another option is that the system includes automatic activation - by a  
15 pacemaker, or other monitoring device, that senses when the victim is  
16 suffering an attack.

17 Yet another option is that of a non-medical emergency when the victim  
18 cannot dial, such as a holdup. A simple button press is easier to perform  
19 during a stressful situation than dialing the telephone.

20 In Figure 1, button 105 is shown as surrounded by a cylinder 107 that  
21 extends higher than the button and thereby reduces the chance of  
22 accidentally pressing the button. Those skilled in the art will readily be able  
23 to devise other methods of avoiding accidentally calling 911.

24 Although the invention has been described with respect to a limited number  
25 of embodiments, those skilled in the art will appreciate that other



- 1       embodiments may be constructed within the spirit and scope of the
- 2       following claims.